FT-847 Operating Manual

There is no doubt that Yaesu are producing the best manuals in the business. The FT-847 manual covers subjects that you will not find readily anywhere else.

For instance, there is a chapter on "high-speed CW meteor scatter operation". How about trying a bit of EME operation? All the basics are covered right here in your FT-847 manual. Of course, you will need to be a dedicated VHF/UHF enthusiast to make a start but I am sure there are a few of you out there. Reading this book just might start you off.

There is a lengthy chapter all about the 'Menu' system. However, to simplify things, Yaesu have supplied a laminated concise single-page guide to the menu system. You will be able to keep this handy, perhaps in your log book for quick reference

Operating and installation are covered in a very comprehensive way and, by the way, Yaesu have supplied a full circuit diagram and a block diagram. Now, if only the book had a better quality cover I would vote it the best instruction manual around.

FT-847 Conclusions

I have to vote the FT-847 the transceiver of the year. It is well in the running for the best transceiver of the decade but we will have to wait a couple of years to find the answer to this one.

The FT-847 is in a class of its own at the moment. At the current price of $2995 it represents unbeatable value. Just look at what you get. First off, a top line HF transceiver with all mode operation. Next, a tri-band VHF/UHF transceiver with all mode operation, and finally a receiver with coverage from 100 kHz to above 500 MHz.

Add all of those up in separate units and my guess is that you would be spending around $10,000.

If you do decide to buy an FT-847, do yourself a favour and put in the Collins filters. They are not cheap at around $200 each but very worthwhile.

My thanks to Dick Smith Electronics for the loan transceiver. All enquiries should be directed to them. I would also like to thank John Patterson VK3ATQ for his help in preparing this review.

BT

■ In the Workshop

A Simple Sheet-Metal Bender

Drew Diamond VK3XU
45 Gatters Road
Wonga Park VIC 3115

New Column

Nowadays, we no longer have to build our own radio equipment. If you have the cash, a multi-band transceiver and all the necessary additional equipment (including antennas) may be purchased off-the-shelf. And if you do not have much money, then quite good radio equipment may be obtained second or third hand. So, what's the point of home-building radio gear?

It must be remembered that ours is basically a technical hobby (some might say vocation). It is in our own best interest, and of society at large, that we should have a pool of persons who, in addition to their operating prowess, are skilled in the various branches of radio craft.

Not least of these is an ability to make or repair things. Moreover, time spent in the workshop also offers relief from care, with the pleasing reward of actually producing something of lasting personal value with our hands and brain.

Hence this new bi-monthly column. In future issues we hope to have a look at such topics as metalwork for radio electronics, construction techniques, interesting faults and solutions, making and applying test instruments, photos of member's finished projects (for "show and tell", and to enthuse others), coils, parts sources, etc and, hopefully, re-print some classic articles from other journals.

But please don't make me do all the talking! Let's hear if you have something useful to share. Circuits, troubleshooting tips, photos, tricks of the trade, parts sources. Send them to me at the address shown. All contributions will be acknowledged.

Simple Sheet-Metal Bender

Here are details of a home-fabricated bender which should suit many of the routine light bending jobs around the amateur's workshop. Because of the nature of things, off-the-shelf and scrap

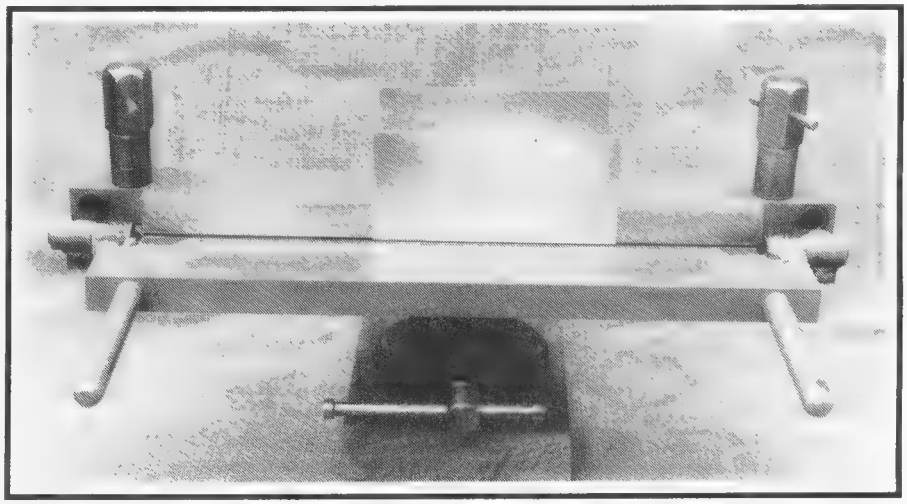
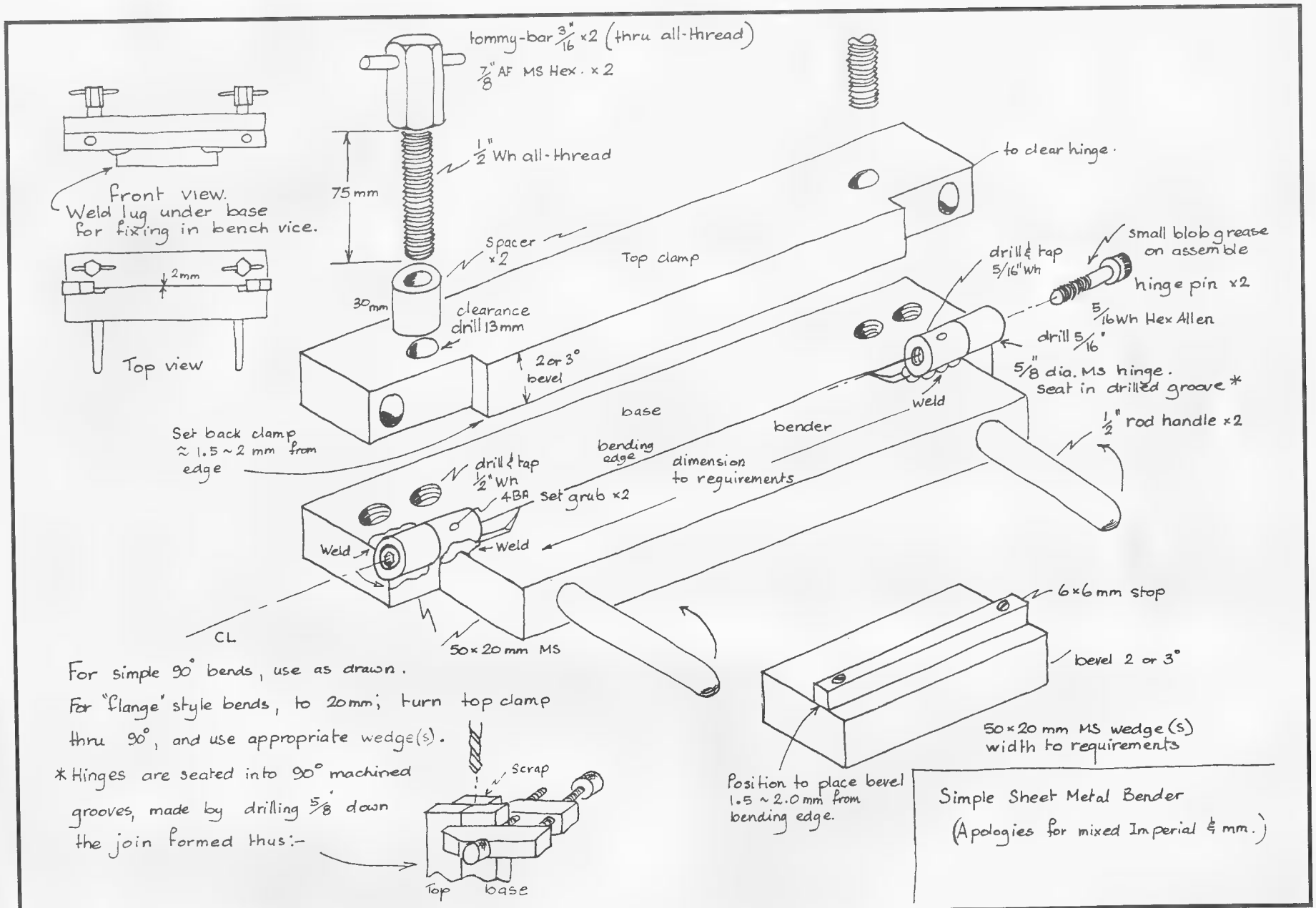


Photo 1 - Plain right-angled bends are obtained by using the top clamp.


tommy-bar 3/16" x2 (thru all-thread)
7/8" AF MS Hex. x2
1/2" Wh all-thread
75mm
Front view.
Weld lug under base for fixing in bench vice.
2mm
Top view
Spacer x2
30mm
clearance drill 13mm
Top clamp
to clear hinge.
drill & tap 5/16" Wh
small blob grease on assemble
hinge pin x2
5/16 Wh Hex Allen
drill 5/16"
5/8" dia. MS hinge. seat in drilled groove *
2 or 3° bevel
base
bender
weld
1/2" rod handle x2
Set back clamp ≈ 1.5 ~ 2 mm from edge
bending edge
dimension to requirements
drill & tap 1/2" Wh
4BA set grub x2
Weld
Weld
CL
50 x 20 mm MS
6 x 6 mm stop
bevel 2 or 3°
50 x 20 mm MS wedge (s) width to requirements
Position to place bevel 1.5 ~ 2.0 mm from bending edge.
For simple 90° bends, use as drawn.
For "flange" style bends, to 20mm; turn top clamp thru 90°, and use appropriate wedge(s).
* Hinges are seated into 90° machined grooves, made by drilling 5/8" down the join formed thus:-
Scrap
Top
base
Simple Sheet Metal Bender
(Apologies for mixed Imperial & mm.)

box materials for instance, both metric and Imperial measurements are used. I apologise if this irritates you.

A bending width of about 12 inches (305 mm) was chosen because, upon placing a rule to my recent projects it was shown that a bender of that capacity would have done the job. Plain right-angled bends are obtained by using the top clamp as shown in Photo 1, and "flange" style bends, typical in box construction, are obtained by rotating the top clamp through 90 degrees and using an appropriate wedge or wedges, as shown in Photo 2. My wedges are (arbitrarily) 2" (about 50 mm), 4" (about 100 mm) and 8" (about 200 mm), and are shown in Photo 3.

By using wedges singly, or in combination, various widths can be accommodated. For bends that are slightly longer than a wedge, or combination, it is not necessary that the full width of the bend be supported; gaps of less than about 20 mm are not usually a problem. Of course, additional wedges can be easily made as need arises. The complete outfit is shown in Photo 4.

Rectangular section MS bar, 50 x 20 mm, was used for the three main components, which are base, top clamp, and bender. To produce nice sharp corners, the bending edge must bear directly upon the material with minimal gap, so the hinge axis must therefore pass along the bending point. The hinges are made from 5/8" diameter MS rod. The segments are each 1" (25 mm) long.

In the lathe, drill two segments to match the shank diameter of your two high-tensile hex Allen bolts - 5/16" is suggested. The other two segments are drilled and tapped to suit the bolts. Drill and tap each of the threaded segments as shown for a 4 BA or M5 recessed grub set-screw, which lock and prevent the hinges from loosening during use.

Fabricate the top clamp, base, and bender components as shown in the drawing. To counter the spring effect when bending sheet, the top clamp and wedges should be filed or milled to a slight bevel of about three degrees. Drill the four top clamp bolts to tapping drill size first. Then, to preserve alignment accuracy, align the top clamp onto the base, and "spot-drill" through for the two configurations. The relative position of the holes is shown pictorially. Actual placement depends upon individual choice, but remember to offset them by an appropriate distance so that they don't clash - 5 or 10 mm is suggested. If using 1/2" Whitworth all-thread for the clamp bolts, clearance drill the top clamp holes to 13 mm. Drill and tap the corresponding holes for the clamp bolts in the base.

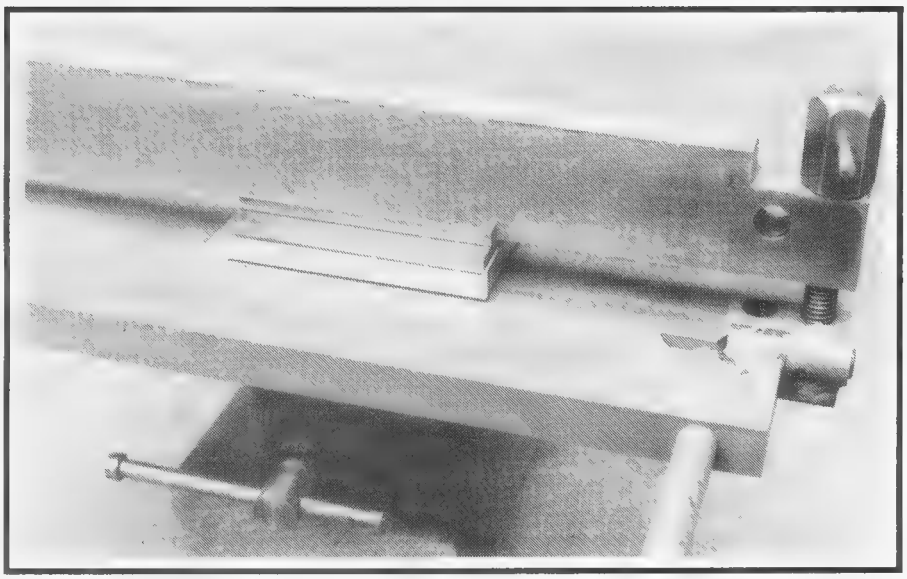


Photo 2 - "Flange" style bends, typical in box construction, are obtained by rotating the top clamp through 90 degrees and using an appropriate wedge or wedges.

I don't have a mill; so, how to machine the seats for the hinge segments? The answer is to use the drill press. The top clamp, base, and a scrap of the 20 x 50 bar is firmly fixed with engineer's clamps (shown in the drawing) and an additional G-clamp (not shown) at right-angles to the engineer's, and the assembly is clamped to a right-angle bracket fixed to the drill table which is moved to one side. The bottom of the assembly must rest upon the lower drill table. Use suitably sized chocks if necessary.

Carefully check that the assembly and drill axis are truly in-line. In stages, drill to 5/8" diameter, 2" depth to accommodate the hinge(s). The additional depth of the seat cut-out (which, perforce, results in the bender component) may be used to advantage later as an extra place to weld, and thus improve the strength of the hinge. Drill the holes for the two handles, which may be welded, or preferably, interference-fitted into the bender.

When ready to weld the hinge segments, align and clamp the hinge assemblies, complete with hinge bolts

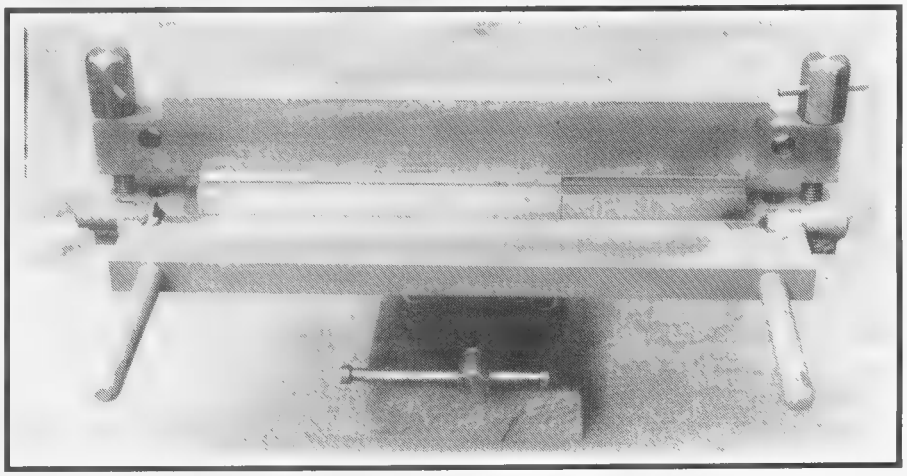


Photo 3 - My wedges are (arbitrarily) 2" (about 50 mm), 4" (about 100 mm) and 8" (about 200 mm).

inserted (dry) into the base and clamp as shown. Tack-weld the segments first, then test that the bender operates smoothly through 93 degrees. If satisfactory, weld the segments in position. Keep in mind at all times which parts need to be able to rotate and come together in operation.

The heads for the clamp-down bolts are made from 7/8" AF hex MS. A length of about 2" (50 mm) each is suggested. In the lathe, drill tapping size to about 1 3/4" (45 mm) depth (that is, not right through). Tap to suit your all-thread. Now, with the all-thread fitted; clamp the job in a machine vice, then cross-drill, through the head and all-thread, to accommodate the tommy-bar as shown. Hint; drill a small pilot hole first, then follow with a drill which is just one or two thou under the diameter of your tommy-bar.

Now, from one side, with a drill of exactly tommy-bar diameter, drill to a depth about 3 mm short of half way (use the depth-stop on the drilling machine to prevent the drill going too far). Reverse the job and do the same from the other side of the head. Drive the tommy-bar through the hole. The under-size segment in the middle will hold the tommy-bar firmly in place, and also prevent the all-thread from turning in the head. In actual operation, a 7/8" AF spanner should be used to pinch up the clamp bolts after hand tightening.

The two 1" (25 mm) spacers are optional. Without them, in plain bending there would be rather a lot of thread projecting below the base, so a pair of spacers saves adjustment time. In the lathe, drill to all-thread clearance (13 mm) for each spacer.

Weld a suitable lug onto the underside of the base for fixing the bender in your bench vice (but please read-on). Upon assembly, apply a blob of grease to the shanks of the hinge bolts. Pinch up the hinge bolts just sufficient to obtain smooth operation consistent with minimum lash. Now tighten the hinge set-screws. Place one or two centre punch marks immediately adjacent to the set screws to cause some hinge metal to spread across the top of the grub, thus locking them in place.

As mentioned, the wedges were chosen to suit my past and projected work. However, they may be made to any reasonable preferred height and width, depending upon your particular application. The stops are necessary to restrain the wedges from being forced backwards during bending; the clamp alone is incapable of preventing this undesirable effect. The stops may be fixed with screws (as shown), or welded on the front side.

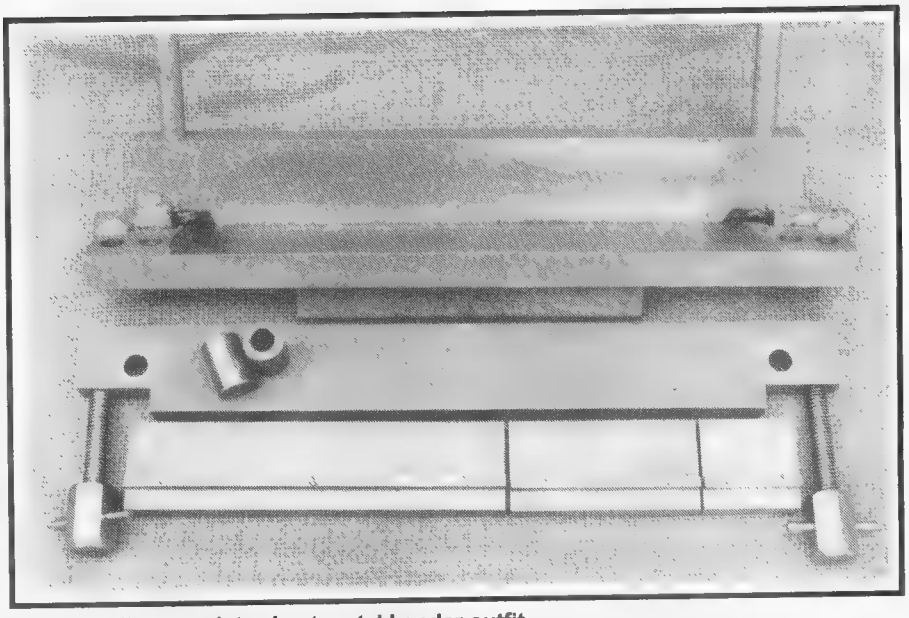


Photo 4 - The complete sheet-metal bender outfit.

A couple of things that I wish I had thought of during construction. Most of the aluminium and brass I bend is in the range of perhaps 1 to 2 mm. As you can see, there is no adjustment for material thickness. In the wedge configuration, two ranges of thickness may be had simply by off-setting the top clamp bolts by an appropriate amount, and turning the top clamp around in actual use. Secondly, the vice lug under the base could be made to extend the hull length of the base, thus providing extra strength, and resistance to bowing of the base during heavy bends. But note, do not weld the full length of the lug, just apply three or four equally spaced welds, otherwise the base may be distorted.

Finally, a safety hint: Once, when lifting the machine out of the vice, the bender accidentally flopped down and closed on my fingers, which naturally were underneath. No damage was done, but it hurt a bit. When inserting or removing the device therefore, make sure that the bender is in the down position, and keep fingers away from the bending edges.

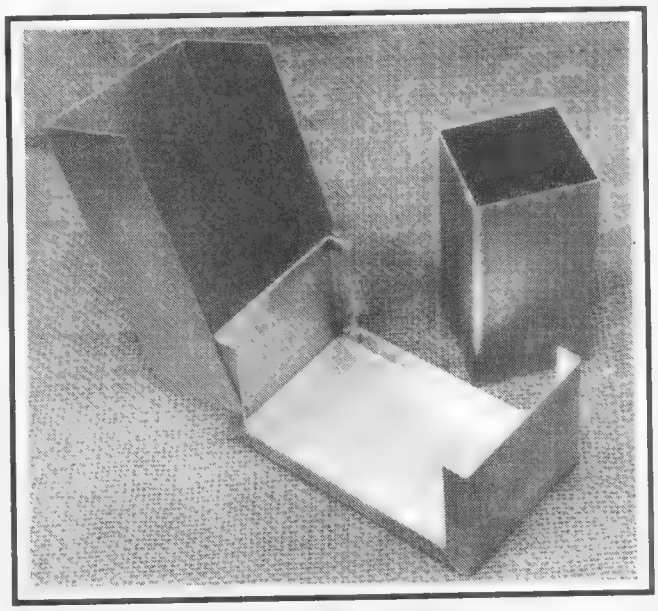


Photo 5 - Some typical boxes.

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